

INVESTIGATION:

The Educational Value of Interactive Whiteboards in the 21st Century Classroom.

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Thanks to:

Hokowhitu School Board of Trustees for financial support.
Hokowhitu School staff for managing so well in my absence.
ICT Consultant Innes Kennard.
All the people and schools I visited in England.

A. RESEARCH PROJECT

Over the past few years interactive whiteboards (IWBs) have become common in classrooms, both overseas and in New Zealand. Whereas their introduction in New Zealand schools has been somewhat ad-hoc, some overseas countries, especially England, have installed these as part of a national programme. Suppliers of IWBs are now placing increasing pressure upon schools to purchase and install these. However as IWBs are rather expensive, schools need to be sure that there is a significant educational benefit that is directly linked to the use of IWBs and that would not be easily achieved by other, less expensive means. There is a danger that the installation of IWBs in schools is being driven by suppliers seeking to develop their business without due consideration of their educational value or demands on teachers. Consequently this expensive technology may be underused, ignoring the possibility that current and future technologies may offer much better value for money (Becta, 2003).

One intent of this investigation was to review current research and implementation in schools to identify higher level student learning outcomes that are directly attributable to the use of IWBs. The investigation, acknowledging that the key to success of IWBs is dependent on teacher skills, also sought examples of best teacher practice. Further to this, there was the question of what role IWBs should have in 21st century classroom environments, and in the delivery of the New Zealand Curriculum, particularly in regard to personalised and collaborative inquiry learning.

B. LITERATURE REVIEW

There is a significant amount of research available online that discusses aspects of the use of IWBs in classrooms. In line with their national emphasis, the great majority of this literature researches the implementation of IWBs in English schools. Internet searches found limited New Zealand sourced literature examining the use of IWBs in New Zealand schools. A complicating factor is that a substantial portion of the research had been produced on behalf of the IWB suppliers (e.g Smart Technologies) who have a vested interest in promoting the advantages of their product.

The literature covers many aspects of the pros and cons of IWBs, with a number claiming that significant benefits resulted from their use in primary school classrooms. In spite of this, however, there is a general consensus that

“evidence on use and impacts remains somewhat unclear and variable” (Rudd, 2007).

Teachers and children generally are positive in their views of IWBs, yet this is not supported by evidence of increased student achievement (Smith et al., 2005, in Schroeder, 2007).

On the other hand there are indications that there are numerous indirect advantages to student achievement, many centred around increased student engagement (Painter et al., 2005). Teachers are able to use IWBs to present information in different ways and thus engage children with differing learning styles (Public Technology Net, 2007). Teachers *“reported the use of the interactive whiteboard for whole-class teaching to increase pupils’ attention and reduce much of the usual fidgeting during ‘carpet sessions’” (Smart Technologies, 2004).*

This begs the question though as to whether this is sufficient to justify the substantial cost of this hardware and if similar results could be achieved with simpler and cheaper technology (Higgins et al, 2007).

Where increased achievement is indicated, the trend is for this to be related to a relatively didactic, teacher led, whole class learning situation (Hammonds, 2008) with concerns being

“a preoccupation that this tool will lead to an overly teacher focused environment and a group of learners passively sitting dazzled by the bells and whistles used by the sage on the stage” (Stanley, 2007)

and also that

“the teacher is effectively anchored to the board, when they should be free to move about the class and drive engagement through personal interaction.” (Klein, 2007)

This concern over IWBs leading to teacher dominated, whole class lessons appears in much of the literature, with conclusions that there has not been significant change in teacher pedagogy (Zevenbergen & Lerman, 2007; Wikipedia 2008).

Recent articles by Bill Ferriter in his “Tempered Radical” blog, are even more definite in the rejection of IWBs as a teaching tool:

“My biggest beef with Whiteboards, though, is that they are poorly aligned with the vision of instruction that most people claim to believe in.” (Ferriter, 2010) and following on from this, he questions whether schools should spend so much money on a tool to enhance teacher dominated classrooms? Ferriter contends that money spend on IWBs could be spent far more beneficially on other technologies, that would have a far greater impact on student learning.

However, there is an acceptance in the literature that IWBs can have a role in the classroom, leading to

“a positive and radical effect on teaching and learning. However, this positive effect depends on teachers using the technology to create a different type of learning environment in the classroom, rather than reinforcing didactic approaches that run counter to the government’s personalised learning agenda” (Rudd, 2007).

It follows therefore that quality teacher professional development on both the skills and pedagogy required to successfully use IWBs in the classroom is essential (Rudd 2007; White, 2007). The Staffroom (2005) takes this further:

“Therefore it is vital to investigate how educators can proficiently integrate new technologies and identify some of the possible pedagogical traps we can fall into. In this regard Greiffenhagen (2005) argues that it is vital for educators to question their pedagogical response to ICT integration. Put simply a whiteboard in the classroom doesn’t equate to very much and it is sometimes all too easy to teach in the same fashion irrespective of the ICT we use.”

This raises another issue, though, the cost in time and money of the intensive teacher professional development required to achieve high quality IWB usage. As Ferriter (2010) observes *“...without time and training, whiteboards become nothing more than really expensive overhead projectors.”*

Hammonds (2008) challenges educators to use technology in real problems that integrate a range of learning areas, noting that the teacher *“remains the most important technology in the room.”* Higgins et al., (2007) observe that is the development of student interactivity that is the key to student achievement and sustained engagement.

Ferriter’s observation *“Rarely paired with a clear vision of the classrooms we’d like to see, a set of tangible objectives that can be measured, or any systematic attempts to evaluate outcomes, Interactive Whiteboards are sad examples of the careless decision making and waste that are crippling some of our schools and systems” (Ferriter 2010)*, combined with the general trends that come through the literature discussed above, strongly suggest that schools should think very carefully before buying IWBs.

My Investigations:

C. PROCESS.

 Travel to England to investigate IWB research, and application of IWBs in education.

Visits to:

- ★ Future Lab in Bristol. Meeting with Tim Rudd, author of paper “ Interactive whiteboards in the classroom”.
- ★ Faculty of Education, University of Cambridge. Meeting with Paul Warwick,, who has expertise in ICT in education, particularly the use of interactive whiteboards in the teaching of Science.
- ★ Norwich. Meeting with ICT Adviser Jill Duman. School visits
- ★ North London (Islington). Meeting with ICT Adviser Michael Walsh. School visits.
- ★ East London (Tower Hamlets). School visits.

D. INVESTIGATIONS

The majority of professional readings had raised concerns about IWBs anchoring teachers in front of their classes, in a modern version of “chalk and talk”. Therefore I was particularly interested to investigate this, through discussion with researchers, advisers and teachers, and through observation of class practices.

Norwich.

Primary Strategy Advisor (ICT) Norfolk Children's Services, Jill Duman, was ambivalent from the outset about the role of IWBs in the classroom, especially in fostering and supporting inquiry learning. We visited several classrooms in two separate schools, Thompson Primary (<http://www.thompson.norfolk.sch.uk>) and Browick Road Infant School (<http://www.browickroad.norfolk.sch.uk>), that had both been awarded BECTA ICT Mark status.

All teachers had been advised of the visit and asked to prepare high quality activities incorporating IWB. Therefore it can be concluded that I saw what was considered best practice in these classrooms. Unfortunately I did not see any activity that made any worthwhile use of IWBs to enhance/enrich learning, or that fostered student interactivity or inquiry learning. In most cases, the same results could have been achieved using a laptop and data projector. Any ‘interactivity’ consisted of calling a child up to select/highlight an object on the screen.

I was stunned by the final classroom I visited, a class of 7 year olds in a higher socio-economic infants school. The teacher had prepared a detailed painting lesson teaching primary colours to the class. Over twenty minutes was spent using a software application on the IWB, with children being selected to manipulate the IWB, while the rest sat and watched. Finally the children were allowed to use actual paints to mix colours following teacher instructions. I felt the IWB was used for this because it was there, rather than letting children loose with the paint pots of primary colours from the start and letting them explore for themselves.

Bristol

My next stop was visiting FutureLab at Bristol (www.futurelab.org.uk) to talk to Senior Researcher Tim Rudd, who had authored the research document that I had found to be the most useful in establishing my background knowledge (refer References). Tim was very welcoming and talked at length about 21st century educational needs and especially 21st century learning environments (his speciality). Tim was adamant in his belief that IWBs have no place in a 21st century classroom environment, with his research showing a very definite pattern where the use of these fostered teacher led learning activities, with children as passive recipients.

Extra to this, Tim also maintained that IWBs have reached the end of whatever role they had in education, with interactive touch surfaces taking over within a very short time. At the time I visited he was trialling a prototype of a junior table that had an A4 sized touch screen embedded in the surface. His other vision of the immediate future was for rapid development in mobile computing.

Cambridge University Faculty of Education (www.educ.cam.ac.uk)

Here I visited lecturer Paul Warwick, who is currently engaged, with colleagues, in research on the use of IWBs, especially in primary science. As with Tim at FutureLab, Paul was very helpful and welcoming. Their research indicates that IWBs are effective in stimulating classroom dialogue;

“Using the IWB as a ‘digital hub’ can effectively draw together different technologies for dialogic teaching and learning: sound and images in particular.” (Hennesey et al 2010).

While the Cambridge University research suggests that IWBs can contribute to improved classroom dialogue, this still places the teacher in the position to control the learning process and does not indicate any value to student led inquiry learning in 21st century classrooms.

When I expressed my doubts about IWBs, Paul did admit to me that he wasn't sure either and that new technologies were likely to play more vital roles.

Islington, North London.

My contact here was Michael Walsh, an ICT adviser for Cambridge Education at Islington (<http://www.islington.camb-ed.com>). From the outset Michael was upfront with his belief that IWBs did not have a place in the classrooms in the schools in his district. We visited Duncombe Primary School (<http://www.duncombeprimary.co.uk>). Again, all teachers knew I was coming and had been asked to prepare best practice use of IWBs.

However as with previous school visits, I saw nothing of educational value and this included a class taught by a New Zealander. I was interested to see if a NZ trained teacher would use an IWB in different ways, but this was not the case. Incidentally, the Head Teacher of this school, Barrie O'Shea, said that he had found that NZ teachers were the best practitioners in his experience.

Later we met with Lynne Gavin, the Head Teacher of Pakeman Primary School (<http://www.pakemanprimary.co.uk>). She had previously worked for one of the IWB companies and we had an interesting discussion about my observations. While defending the use of IWBs, she too was unable to substantiate their value as a learning tool, additional to their use as a teaching tool, in class programmes. I saw nothing in her school to change my opinions.

Tower Hamlets, East London

Two further school visits, with different results. At Elizabeth Selby Infants School I had a long conversation with the ICT teacher and he showed me a wide range of IWB related activities. However in general, the great majority of these did not require an IWB and could have been equally well achieved using a laptop and data projector. He did tell me that teachers really liked the IWB, but on further exploration, this was as a planning/teaching tool, especially using the whiteboard function where brainstorms etc could be saved and retrieved the following day. Ultimately, he also confessed that he was unable to really vouch for the educational effectiveness of this technology, even though he made extensive use of this in his own classroom.

My final visit was to Phoenix Special School, East London (www.phoenix.towerhamlets.sch.uk). This school focused on providing a high quality learning environment for autistic children. Here I finally saw an IWB being used in a very beneficial way, in a class of 8 early adolescent children. The IWB was well used to provide a highly interactive, stimulating and responsive experience for these children and clearly had a very significant impact on the students.

E. FINDINGS

My investigations centred on the value of IWB in 21st century classrooms and through that, their use in student based, inquiry learning. I did not investigate the value to teachers as a teaching tool. Therefore, while I accept that WBs can add some value as tools to enhance didactic pedagogy, my findings reflect this focus on 21st century learning and as a tool to facilitate student inquiry learning.

Having read very widely, visited a number of best practice schools in England, talked to researchers, teachers and ICT advisers in both England and New Zealand, I came to the very definite opinion that there is minimal or no place for IWBs in inquiry learning focussed 21st century classrooms. On the other hand, it is very clear that projection technology/large LCD screens are essential in all classrooms.

Schools should view IWBs with quite a degree of skepticism and make decisions based on their educational philosophy and needs of the children, not the sales pitches and 'whizz bang' effects demonstrated by highly trained salespeople.

Reasoning:

While IWBs come with very comprehensive interactive software tools (the main justification for their use) I saw no teacher making anything other than basic use of these. Discussions with ICT advisers both in England and in New Zealand suggests that this is common place.

I suggest that one reason for this is the steep learning curve required for a teacher to gain mastery. This is too much for the majority of “non-technically minded” teachers, who struggle with mastering the basics of computer operation, let alone the intricacies of IWB software. It goes without saying that there are teachers who will achieve high level learning outcomes with IWBs but it is my contention that these are the exceptions. Without extensive use of the software, the IWBs lose any advantages that are available using just laptops and data projectors.

It is evident that new technologies are imminent that will take over most/all of the functions of IWBs. The new Apple iPad is a good example of this, as it is highly likely that there will be apps available that enable remote control of a computer screen. I can already do this on my iPhone, including using Easiteach IWB software, although the small touchscreen size does cause some difficulties. This will be overcome by the larger iPad and this will enable full interactivity from any position in the classroom, and not just limited to the teacher.

Students also will be able to have control (genuine ‘interactivity’) and the relatively cheaper price means several iPads per classroom, rather than one fixed IWB which will not be in use for part of each teaching day. Interactive table surfaces are also in development, either as touch screens or using newer technologies. This approach removes the concern about teachers being ‘anchored’ in front of their classes, presenting to a passive audience.

The term “interactive” does not mean interactive learners. The so-called interactivity consisted of children being called to the front to highlight something. Teachers were doing this with a piece of chalk in the pre-digital era and so the IWB added very little. I did not see any other ‘interactivity’ and I struggle to think of many worthwhile ways to increase this.

On a purely cost-benefit analysis, I have deep reservations as to whether the outlay to equip classrooms with IWBs (excluding the essential projection technology) brings with it equivalent increase in the value of the learning. Could the money to purchase each IWB be better used, e.g on laptops, iPods, desktop computers, or even on ‘traditional learning materials such as books?

Therefore I contend that the capital outlay on IWBs is not cost effective and that children’s learning is not enhanced to a significant levels in ways that are not achievable by other means.

Footnote:

The chance to have an extended break from my desk had other positive benefits, extra to the research into IWBs. The opportunity to rest and reflect has enabled me to refresh my principalship and I returned to my job feeling very positive and looking forward to future challenges. I feel enlivened and that I am thinking and planning at a much higher level. This will have major impact on the development of the school in coming years. Colleagues who have also had sabbaticals also report similar outcomes.

Because of this, I believe strongly that sabbaticals should be an automatic entitlement rather than the present lottery.

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